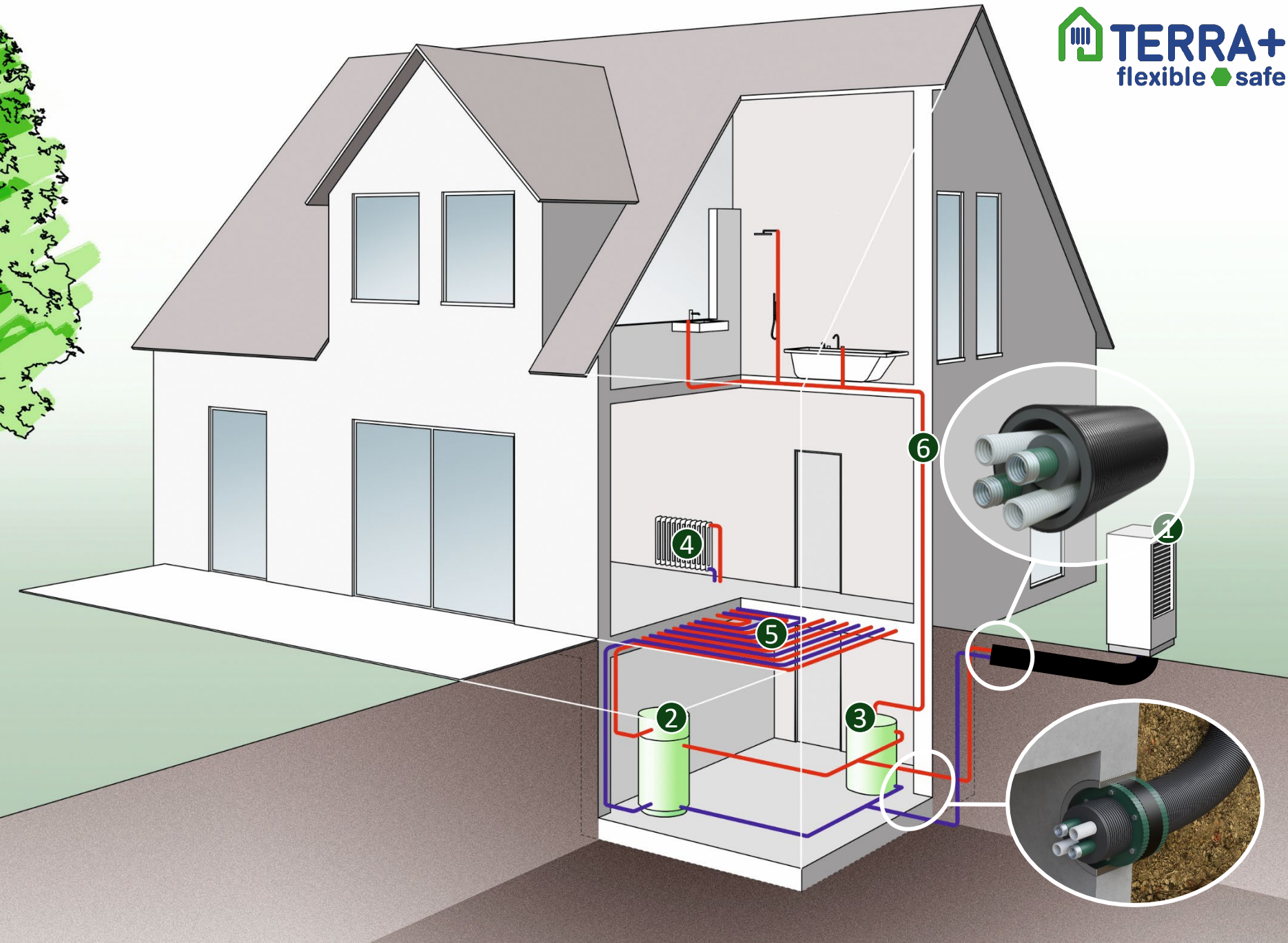
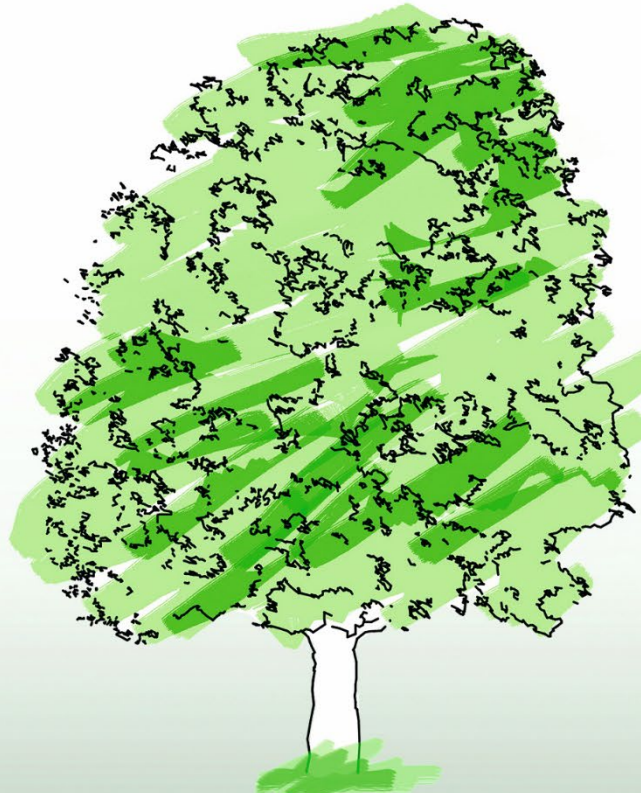


TERRA+

PRE-INSULATED PIPES
FOR AIR-TO-WATER
HEATPUMPS
(for usage in the soil)





- 1 Air-to-water heat pump
- 2 Buffer
- 3 Drinking-hot water
- 4 Radiator
- 5 Underfloor heating
- 6 Hot water pipe

ADVANTAGES OVER COMPETITORS

TERRA+	Preinsulated X-PE or Multiskin pipes
Very flexible, small bending radii	Large bending radii, risk of kinking
Connections completely tight due to double sealing technology	Dilatation of the material: leakages in the connection of pipe and fitting can occur
Excellent insulation (50%, 100% & 200%)	Insulation of ~50-70%
Resistance to high temperature and pressure	Higher temperatures only for a short time
High resistance to corrosion	Embrittlement process of the plastic pipes
Easy installation and customization	Preparation of the pipes with pipe cutter and heat gun

Dilatation of PE pipes

- Linear expansion due to heat
- The pipe expands according to the following formula:

$$\underline{\Delta L} = \Delta T * \alpha * L$$

ΔL : Temperature-related change in length in millimeters [mm], ΔT : Temperature difference in Kelvin [K]

α : Thermal expansion coefficient [mm/(m*K)], L : Pipe length in meter [m]

Example:

L = 10m

	10K	20K	30K	40K	50K	60K
ΔL Stainless steel [mm]	1,7	3,4	5,1	6,8	8,5	10,2
ΔL X-PE [mm]	16,0	32,0	48,0	64,0	80,0	96,0

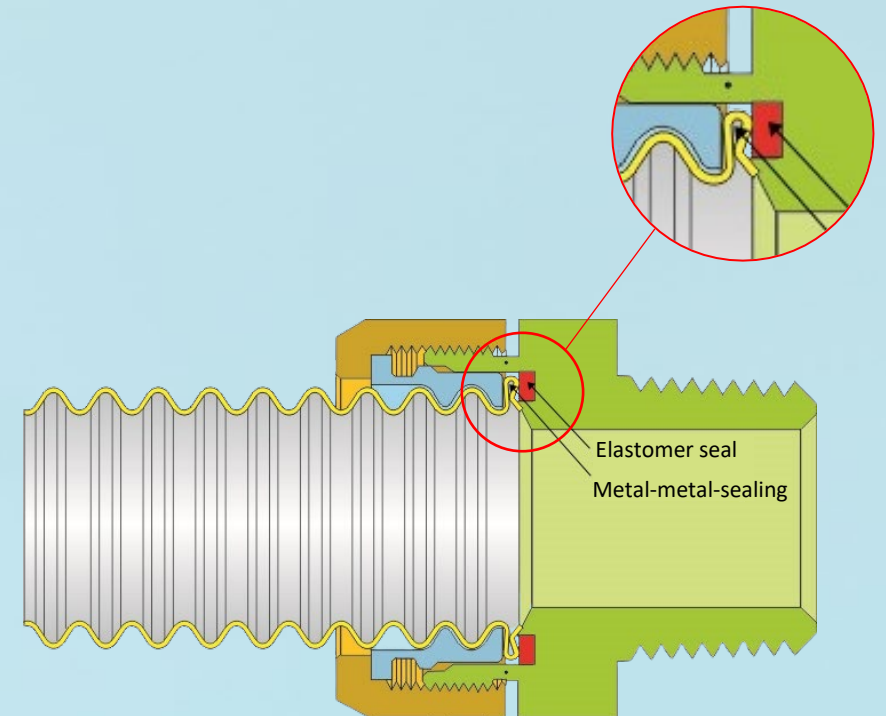
TENFOLD increase in expansion

Consequences PE pipe: Linear expansion cannot be absorbed → Pressure/tension on joints → Kinking → Leakage

The TERRA+ corrugated stainless steel pipe can expand in the jacket without any problems and absorbs a change in length in the corrugation.

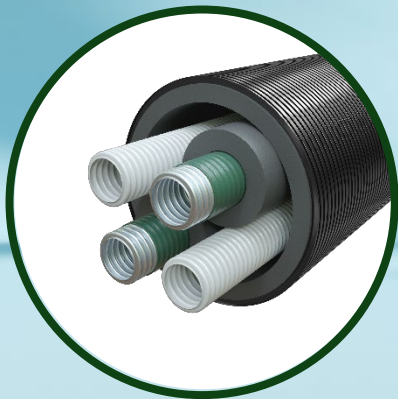
MAXIMUM SAFETY

- Double sealing technology
- Patented technology
- High-temperature resistant elastomer (up to 150°C)
- Pipes factory-tested with helium for 100 % tightness
- High-quality materials used:
 - Stainless steel: 1.4301
 - Brass: CW612N

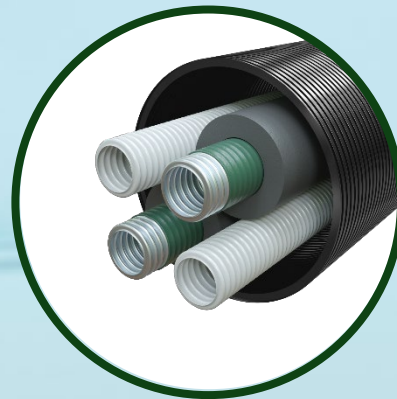


DIVERSITY OF VARIANTS

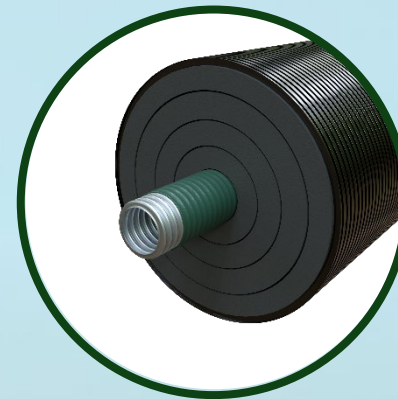
- **4 options** for maximum applications of customers
- HDPE jacket -> corrugated, for maximum flexibility and soil usage
- X-PE + metallized PET film for even better thermal insulation
- Heat caps included for all options



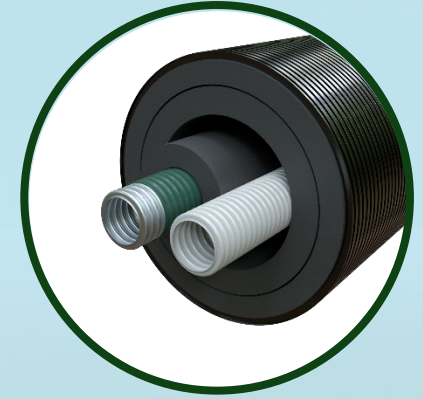
Option 1



Option 2



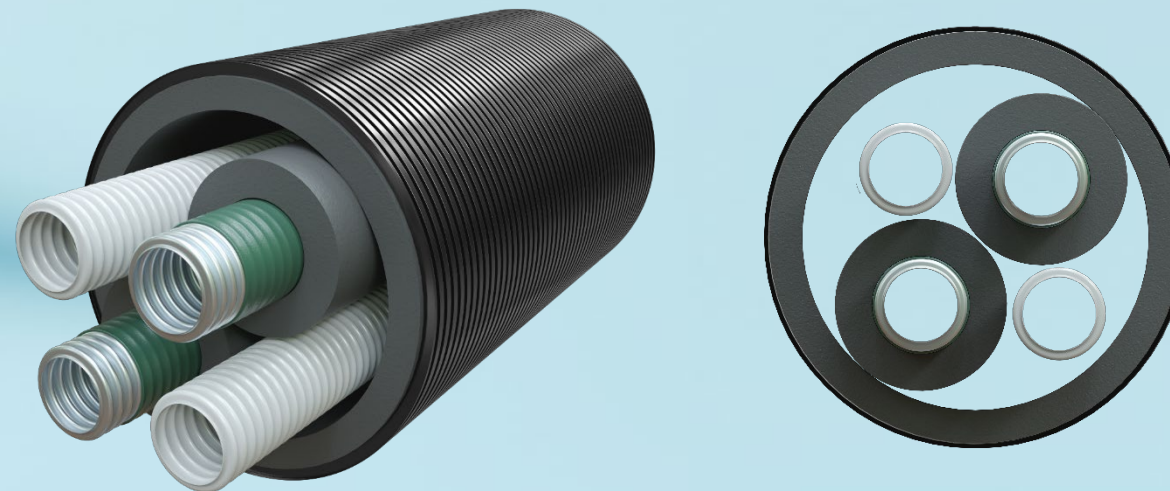
Option 3



Option 4

OPTION 1

- 100% insulation ($\lambda = 0,030 \text{ W/mK}$)
- 2 x CSST, 2 x ductwork
- Dimensions DN25 - DN50
- Length: 2 – 16m (2m steps)
17m – Max (1m steps)

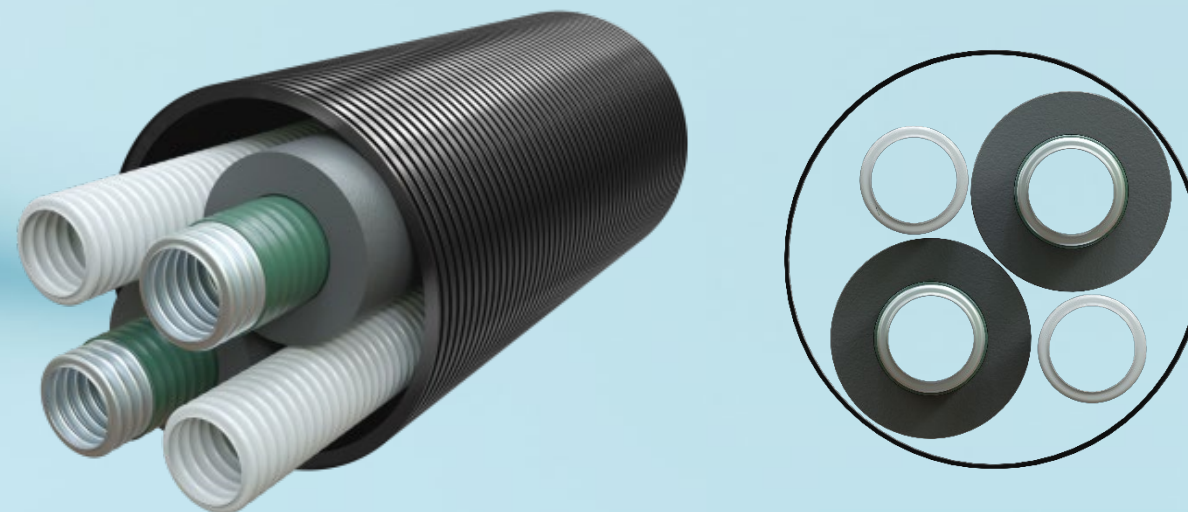


	Max. length
DN25	104m
DN32	74m
DN40	59m
DN50	45m

Pipe dimensions	Insulation-thickness of each SS pipe	Insulation-thickness on black HDPE pipe	Ductwork	Dimension HDPE-pipe (mm)
DN25	12mm	16mm	2 x DN32	160
DN32	16mm	16mm	2 x DN32	200
DN40	18,5mm	16mm	2 x DN32	200
DN50	19mm	16mm	2 x DN32	250

OPTION 2

- 50% insulation ($\lambda = 0,030 \text{ W/mK}$)
- 2 x CSST, 2 x ductwork
- Dimensions DN25 - DN50
- Length: 2 – 16m (2m steps)
17m – Max (1m steps)

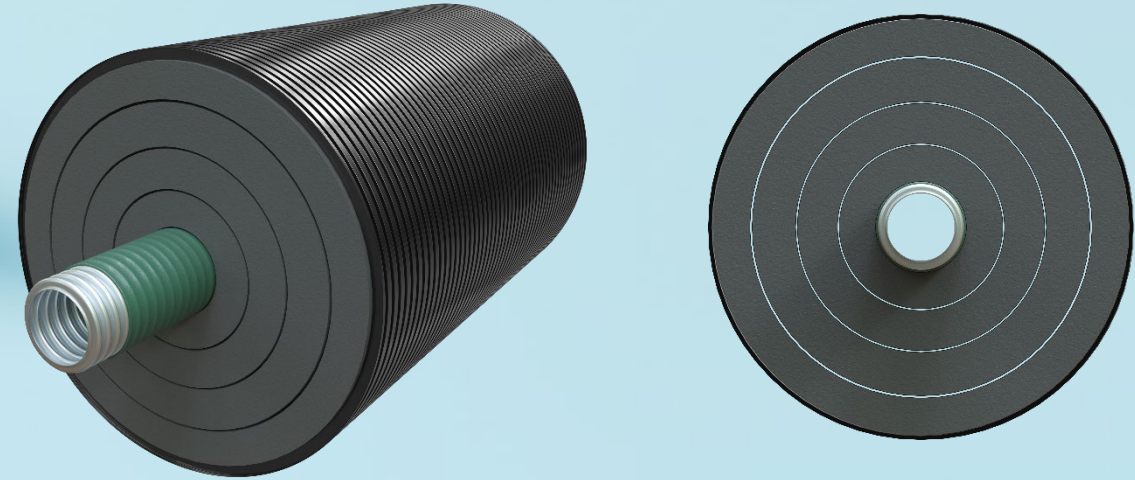


	Max. length
DN25	104m
DN32	74m
DN40	59m
DN50	45m

Pipe dimensions	Insulation-thickness of each SS pipe	Ductwork	Dimension HDPE-pipe
DN25	18mm	2 x DN32	160
DN32	18mm	2 x DN32	160
DN40	16,5mm	2 x DN32	160
DN50	21mm	2 x DN32	200

OPTION 3

- 200% insulation ($\lambda = 0,030 \text{ W/mK}$)
- 1 x CSST
- Dimensions DN25 - DN50
- Length: 2 – 16m (2m steps)
17m – Max (1m steps)

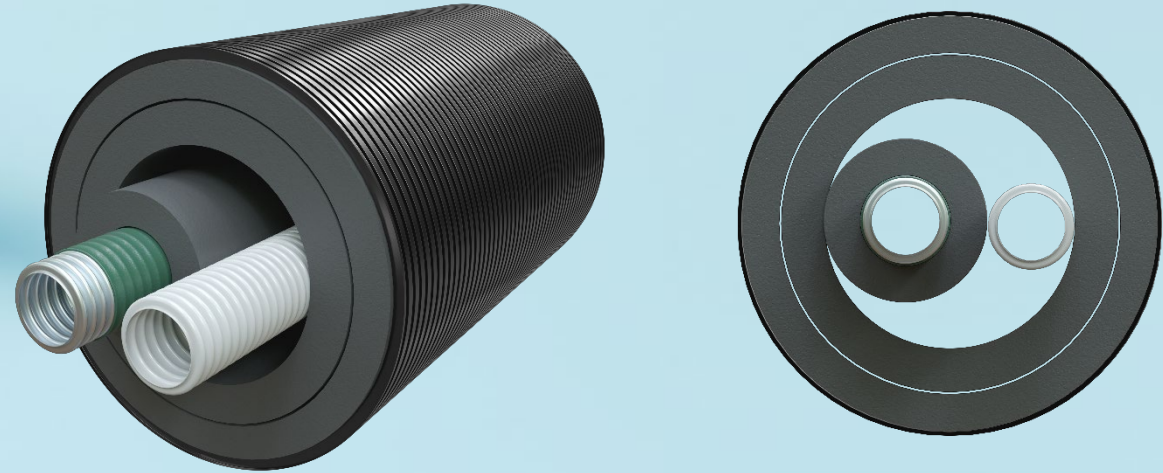


	Max. length
DN25	104m
DN32	74m
DN40	59m
DN50	45m

Pipe dimensions	Insulation-thickness of each SS pipe	Dimension HDPE-pipe
DN25	56mm	160
DN32	52mm	160
DN40	70mm	200
DN50	80mm	250

OPTION 4

- 200% insulation ($\lambda = 0,030 \text{ W/mK}$)
- 1 x CSST, 1 x ductwork
- Dimensions DN25 - DN50
- Length: 2 – 16m (2m steps)
17m – Max (1m steps)



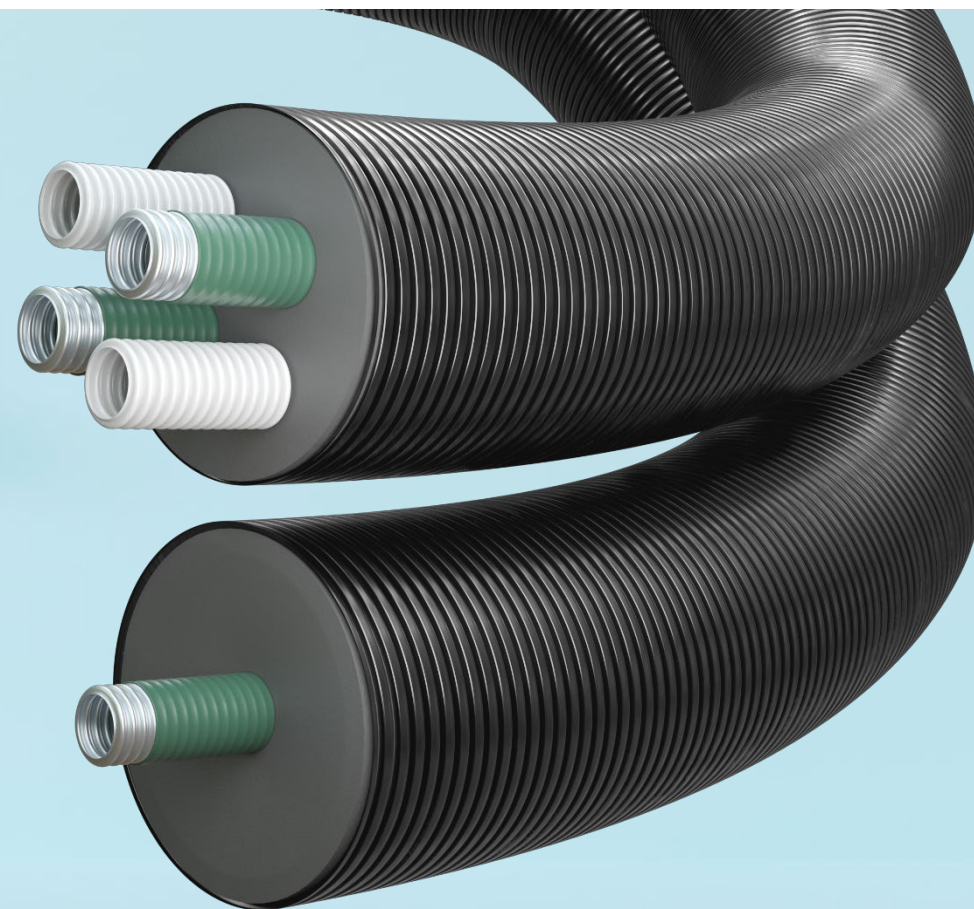
	Max. length
DN25	104m
DN32	74m
DN40	59m
DN50	45m

Pipe dimensions	Insulation-thickness of each SS pipe	Ductwork	Dimension HDPE-pipe
DN25	56mm	1 x DN32	160
DN32	52mm	1 x DN32	160
DN40	70mm	1 x DN32	200
DN50	80mm	1 x DN32	250

MAXIMUM FLEX

- Extended CSSTs & ductwork for even more flexibility
- Simplified connection to the heat pump or buffer

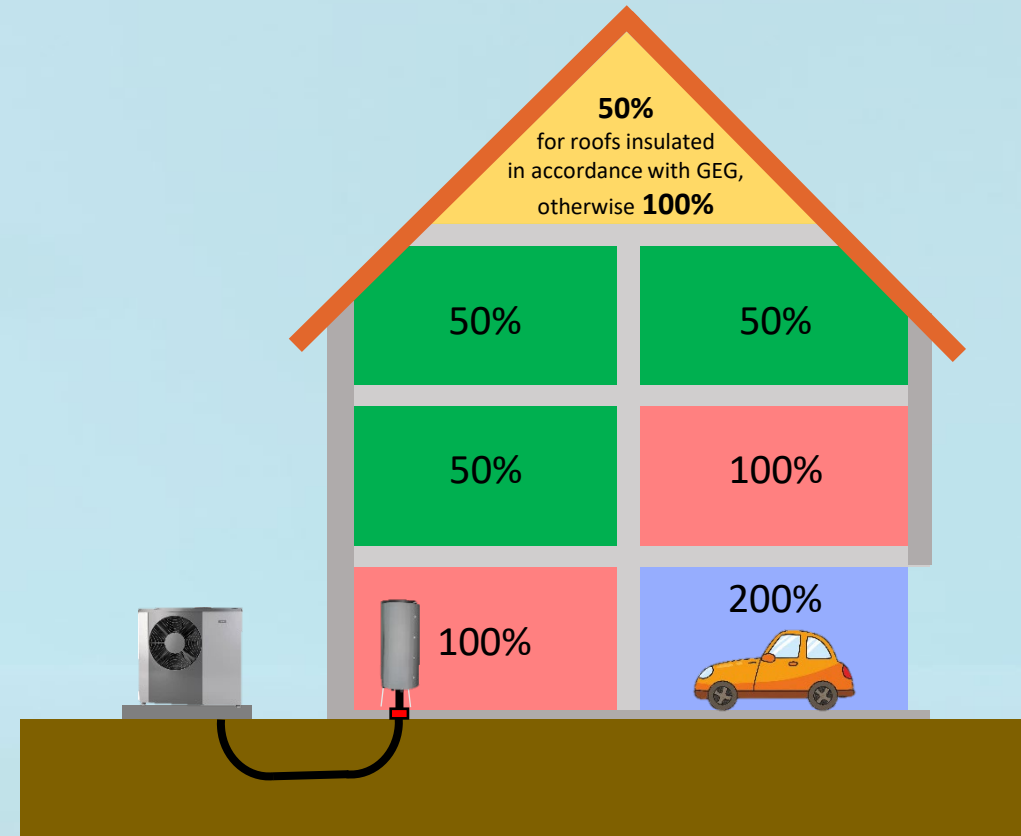
Pipe dimensions	Additional length L on each side (Steel pipe wit PE cover + ductwork)
DN25	25cm
DN32	25cm
DN40	30cm
DN50	30cm



Energy Saving Ordinance

- The TERRA+ range is built to meet all the requirements of the German GebäudeEnergieGesetz (GEG, formerly EnEV) & Austrian standard ÖNORM H 5155 for heat distribution pipes.

GEG/H 5155	
50%	Pipes located in heated rooms (solid inner wall, floor of heated rooms, suspended ceiling)
100%	Pipes located in or above/near unheated rooms (solid wall, outside wall, floor, shaft)
200%	Pipes that come into contact with the outside air and soil (garage, outside of the building)



ACCESSORIES



- **Male threaded fittings**
- DN25: R 1"
- DN32: R 1" & 1 ¼"
- DN40: R 1 ¼" & 1 ½"
- DN50: R 1 ¼" & 2"



- **Female threaded fittings**
- DN25: Rp 1"
- DN32: Rp 1" & 1 ¼"



- **Copper compression fittings**
(on request)
- DN25 x 22mm
x 28mm
- DN32 x 22mm
x 28mm
x 35mm

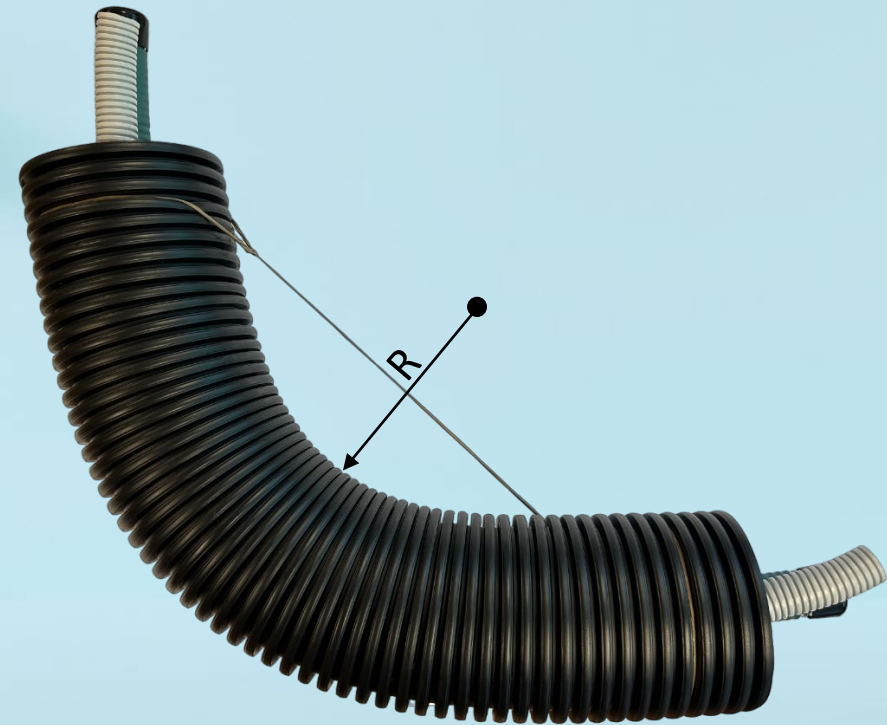


- **End-caps**
(Water and dust cap)
- OD HDPE-pipe:
160mm
200mm
250mm

FLEXIBILITY

- TERRA+: No risk of kinking of the medium pipe
- Bending radii R:

OD Jacket	TERRA+	WATTS	TERRENDIS
160mm	0,25m	0,60m	0,60m
200mm	0,35m	-	0,80m
250mm	0,60m	-	-



PRESSURE DROP

- CSST: 1.4301
- Medium: Water
- Temperature: 35°C
- Density: 994,030 kg/m³
(= 0,994 g/cm³)

Heating capacity: 6 kW										
			DN25		DN32		DN40		DN50	
Δ T	l/h	l/s	m/s	mbar/m	m/s	mbar/m	m/s	mbar/m	m/s	mbar/m
5K	1041	0,289	0,58	5,28	0,35	1,47	0,22	0,43	0,13	0,11
6K	868	0,241	0,49	3,67	0,29	1,02	0,19	0,30	0,11	0,07
7K	744	0,207	0,42	2,70	0,25	0,75	0,16	0,22	0,09	0,05
8K	651	0,181	0,37	2,07	0,22	0,58	0,14	0,17	0,08	0,04
9K	578	0,161	0,32	1,63	0,19	0,45	0,12	0,13	0,07	0,03
10K	521	0,145	0,29	1,32	0,17	0,37	0,11	0,11	0,07	0,03

Heating capacity: 8 kW										
			DN25		DN32		DN40		DN50	
Δ T	l/h	l/s	m/s	mbar/m	m/s	mbar/m	m/s	mbar/m	m/s	mbar/m
5K	1388	0,386	0,78	9,39	0,46	2,61	0,30	0,77	0,17	0,19
6K	1157	0,321	0,65	6,53	0,39	1,82	0,25	0,53	0,15	0,13
7K	991	0,275	0,56	4,79	0,33	1,33	0,21	0,39	0,12	0,10
8K	868	0,241	0,49	3,67	0,29	1,02	0,19	0,30	0,11	0,07
9K	771	0,214	0,43	2,90	0,26	0,81	0,17	0,24	0,10	0,06
10K	694	0,193	0,39	2,35	0,23	0,65	0,15	0,19	0,09	0,05

Heating capacity: 10 kW										
			DN25		DN32		DN40		DN50	
Δ T	l/h	l/s	m/s	mbar/m	m/s	mbar/m	m/s	mbar/m	m/s	mbar/m
5K	1735	0,482	0,97	14,68	0,58	4,09	0,37	1,20	0,22	0,29
6K	1446	0,402	0,81	10,19	0,48	2,84	0,31	0,83	0,18	0,20
7K	1239	0,344	0,70	7,48	0,41	2,08	0,27	0,61	0,16	0,15
8K	1084	0,301	0,61	5,73	0,36	1,59	0,23	0,47	0,14	0,11
9K	964	0,268	0,54	4,53	0,32	1,26	0,21	0,37	0,12	0,09
10K	868	0,241	0,49	3,67	0,29	1,02	0,19	0,30	0,11	0,07

Heating capacity: 12 kW										
			DN25		DN32		DN40		DN50	
Δ T	l/h	l/s	m/s	mbar/m	m/s	mbar/m	m/s	mbar/m	m/s	mbar/m
5K	2082	0,578	1,17	21,13	0,69	5,88	0,45	1,72	0,26	0,42
6K	1735	0,482	0,97	14,68	0,58	4,09	0,37	1,20	0,22	0,29
7K	1487	0,413	0,83	10,78	0,49	3,00	0,32	0,88	0,19	0,21
8K	1301	0,361	0,73	8,25	0,43	2,30	0,28	0,67	0,16	0,16
9K	1157	0,321	0,65	6,53	0,39	1,82	0,25	0,53	0,15	0,13
10K	1041	0,289	0,58	5,28	0,35	1,47	0,22	0,43	0,13	0,11

HEAT LOSS

- High-quality insulation thanks to the combination of air/X-PE and metal
- Table:
 - Medium: Water
 - Soil temperature: 10°C

Type	Insulation (mm)	OD jacket (mm)	Bendig radius (m)	Heat loss (W/m)		
				5K	7K	10K
TERRA+ Option 1 (DN25)	28mm	160	0,25	0,65	0,91	1,3
WATTS Microflex (DN25)	27mm	160	0,5	1,96	2,74	3,91
TERRA+ Option 2 (DN32)	18mm	160	0,25	0,98	1,37	1,95
WATTS Microflex (DN32)	15mm	160	0,6	3,72	5,2	7,45

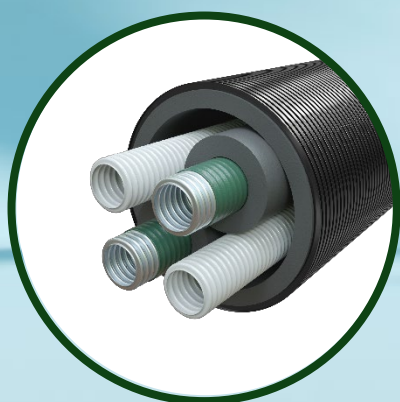
WEIGHTS

DIM	Kg/m
DN25	2,75
DN32	3
DN40	4
DN50	5

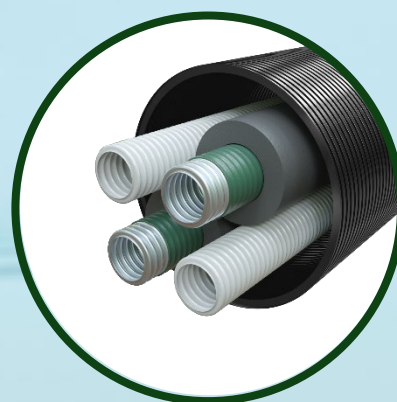
DIM	Kg/m
DN25	2,5
DN32	2,75
DN40	3,5
DN50	4,5

DIM	Kg/m
DN25	2
DN32	2,5
DN40	3
DN50	4,5

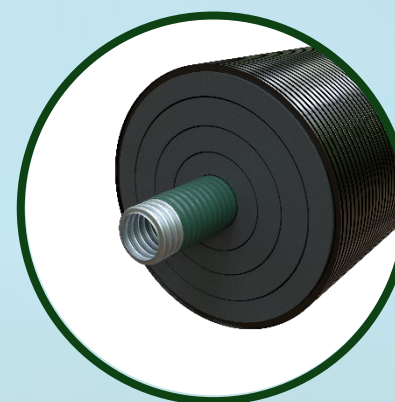
DIM	Kg/m
DN25	2
DN32	2,5
DN40	3
DN50	4,5



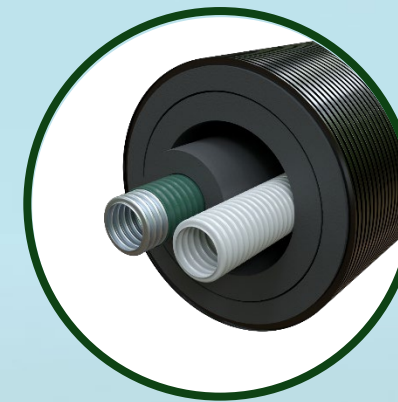
Option 1



Option 2



Option 3



Option 4

QUESTIONS?

